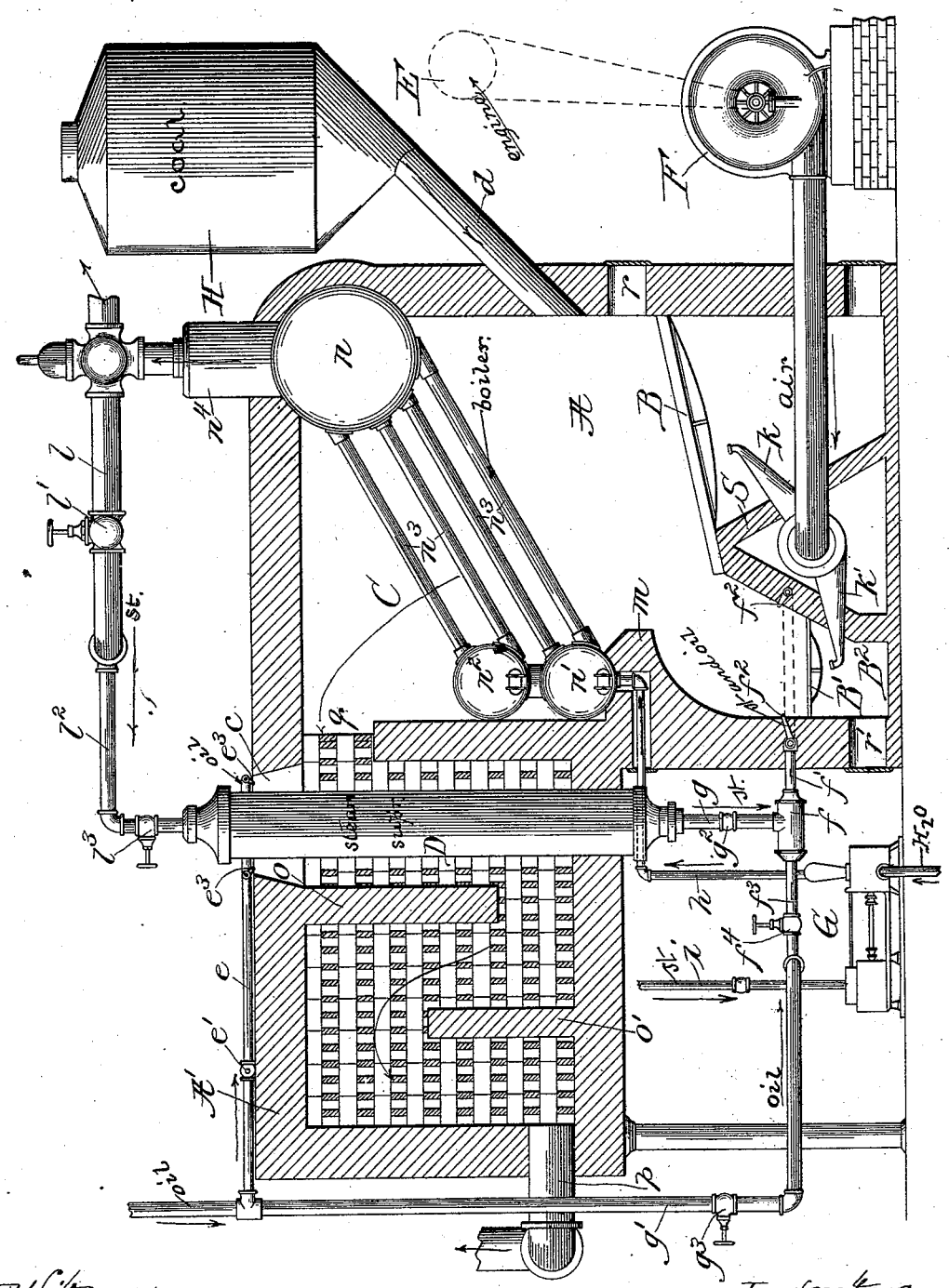
(No Model.)

J. W. KENEVEL.

GAS MAKING APPARATUS.

No. 522,326. Patented July 3, 1894.



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GAS-MAKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 522,326, dated July 3, 1894.

Application filed November 14, 1893. Serial No. 490,949. (No model.)

To all whom it may concern:

Be it known that I, JEANNOT W. KENEVEL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Gas-Making Apparatus, of which the following is a specification.

My invention relates to an improvement in apparatus for manufacturing producer-gas with the employment of superheated steam; and the object of my invention is to provide an apparatus for the purpose named which shall operate very economically to generate a good quality of producer-gas, and make and superheat the steam employed in the manufacture of the gas, and also for working a pump by which to feed the boiler, by the heat from the products of combustion on their way from the fuel-chamber to the discharge-flue.

My invention consists in the construction and combinations of parts forming my improved apparatus.

The accompanying drawing represents my improved gas-making apparatus by a partly broken view in longitudinally sectional elevation.

A denotes the fuel or generating chamber, having a covered stoke-hole r in its front wall and from near which extends a grate B, preferably inclined, as shown, with its inner end resting on a support S, between which and the rear wall of the fuel-chamber, but on a plane lower than that of the grate S, is a supplemental grate B′ over the ash-pit B^2, from the base of which leads the clean-out opening r'.

Behind the chamber A, and communicating with it through a passage q, is a checker-chamber A′ in which to fix the gas on its way from the generating-chamber to the outlet p at the base of the checker-chamber and by which the gas-product is led to the point of storage or use; and in the chamber A′ are built the perpendicular, relatively overlapping, partitions o and o', which extend across the chamber, respectively, from the top and bottom but short of the lower and upper sides to afford an irregular passage through it and thereby retain the products of combustion the longer in their course to the outlet.

C is a boiler formed, by preference, of a reservoir n housed in the upper forward corner of the chamber A, and of the two smaller reservoirs n' and n^2 having free communication with each other and supported one above the other on a shelf m extending from the rear wall of the generating chamber; the reservoirs, thus at opposite sides of the chamber, being exposed to the heat of the products of combustion therein and connected by tubes n^3 which thus extend across the path of the products of combustion to the passage q. The advantage in forming the boiler in sections, so to speak, placed at opposite sides of the fuel-chamber is that the extent of surface to be heated is the better exposed to the heating medium; and the advantage of forming the inner of the sections in the two reservoirs n' and n^2, is that they may be placed one above the other to extend less far over into, and present the less obstruction in the path of the products of combustion, than if they were in one, like the section n, though their joint capacity may correspond with the capacity of the latter.

The steam-dome n^4 has connected with it a conduit l containing a shut-off valve l', from which a pipe l^2, provided with a valve l^3, leads into the upper end of a steam-superheating drum D, extending vertically through the checker-chamber A′. The conduit l is shown broken away at one end to indicate that it may lead to other points also, if desired, as to an engine, indicated at E, to actuate the latter to drive a fan or blower F for supplying air to tuyeres k and k', respectively under the grates B and B′; and, by way of a steam-pipe i, to a pump G to drive the latter to feed water, through the pipe h, into the boiler C.

From the lower end of the superheating device D extends a pipe g, containing a valve g^2 and leading to a head f, whence proceeds a branch f' about the chamber above the grate B′, in the wall thereof and of the support S, and having steam-jets f^2 directed into said chamber. A pipe f^3, containing a shut-off valve f^4, connects the head f with a pipe g' containing a valve g^3, and which is shown broken at its upper end to indicate that it leads from a hydrocarbon oil supply (not shown). From the pipe g' there leads a branch e containing a shut-off valve e', about the upper end of the drum D, where are pro-

vided the oil-jets e^3 directed into the checker-chamber at the opening c in its top through which the drum extends.

The apparatus, constructed as described, while it may be used with coal in any form, is particularly adapted for the use of coal-slack, for feeding which I provide a holder H, having a hopper bottom from which extends a chute d through the front wall of the chamber A above the grate B.

The products of combustion from the burning fuel in the generating chamber A (and which is supplied with coal from the holder H) ascend therein, heating the boiler C to generate steam, and pass into and through the retarding passage in the checker-chamber A′ to the outlet p. Steam from the dome n^4 works the blower F and the pump G; and some passes through the drum D wherein it is superheated by the products of combustion and heat in the checker-chamber. The superheated steam is injected with oil from the pipe g' into the chamber A near the grate B′ through the jets f^2 and oil is injected through the opening c into the checker-chamber, to act upon the products of combustion therein, which escape as a fixed producer-gas through the outlet shown at the base of the back of the checker-chamber, whence it is led off to the point of use.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a gas-making apparatus, the combination of the generating chamber, a steam boiler therein in the path of the products of combustion, a checker-chamber communicating with the generating chamber and having an outlet, and a steam-superheater in the checker-chamber, communicating with the dome of said boiler and leading into the generating chamber, substantially as described.

2. In a gas-making apparatus, the combination of the generating chamber, a steam-boiler therein in the path of the products of combustion, a checker-chamber communicating with the generating chamber and having an outlet, a steam-superheater in the checker-chamber, communicating with the dome of the steam boiler, and having pipe-connections leading into the generating-chamber and a hydrocarbon oil pipe leading into the checker-chamber, substantially as described.

3. In a gas-making apparatus, the combination of the generating chamber, a steam-boiler comprising reservoirs at opposite sides of said chamber connected by tubes extending across the same, a checker-chamber communicating with the generating chamber and having an outlet, and a steam-superheater in the checker-chamber, communicating with the dome of said boiler and leading into the generating chamber, substantially as described.

4. In a gas-making apparatus, the combination of the generating chamber, a steam-boiler comprising a reservoir n at one side, in said chamber, and provided with a dome n^4, and intercommunicating reservoirs n' and n^2 supported one above the other at the opposite side of said chamber and having tube-connections n^3 with the reservoir n, extending across the generating chamber, a checker-chamber A′ communicating with the generating chamber and having an outlet, and a steam-superheater D in the checker-chamber, communicating with the dome of the steam boiler and leading into the generating chamber, substantially as described.

5. In a gas-making apparatus, the combination of a generating chamber, a steam-boiler comprising a reservoir n at one side, in said chamber, and provided with a dome n^4, and intercommunicating reservoirs n' and n^2 supported one above the other at the opposite side of said chamber and having tube-connections n^3 with the reservoir n, extending across the generating chamber, a checker-chamber A′ communicating with the generating chamber and having an outlet, a steam-superheater D in the checker-chamber, communicating with the dome of the steam boiler and leading into the generating chamber, a fan F driven by an engine fed with steam from said dome, tuyeres by which air from the fan is directed into the generating chamber, and a pump G communicating with the dome to be driven by steam therefrom and operating to discharge feed-water into the reservoir n', substantially as described.

6. A gas-making apparatus comprising, in combination, a generating chamber A containing the inclined grate B, sustained at one end on a support S, and a grate B′, a steam-boiler C formed of a reservoir n at one side in said chamber and provided with a dome n^4, and intercommunicating reservoirs n' and n^2 supported one above the other at the opposite side of said chamber and having tube-connections n^3 with the reservoir n, extending across the generating chamber, a checker-chamber A′ communicating at q with the chamber A, and having an outlet p and the partitions o and o', a steam-superheater D in the checker-chamber having pipe connections terminating in steam-jets and leading into the generating chamber above the grate B′, a fan F driven by an engine E fed with steam from said dome, tuyeres k and k', under said grates and communicating with the fan, and a pump G communicating with the dome to be driven by steam therefrom and operating to discharge feed-water into the reservoir n', the whole being constructed and arranged to operate substantially as described.

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In presence of—
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